at least partially through the baffle opening towards the plasma discharge from the intermediate space between the cathode material surface and the baffle arrangement.

2. (Amended) An electrode arrangement for the plasma-aided coating of a substrate with a layer, comprising:

at least a first and second material component which produces a plasma discharge;

an anode arrangement which defines said first material component at an anode material surface for evaporation;

a cathode arrangement which defines said second material component at a cathode material surface, said cathode material surface being constituted by an evaporation-active part supporting the plasma discharge and an evaporation-inactive part not supporting the plasma discharge; and

a motion-producing device for moving said evaporation-active part, and thereby moving said evaporation-inactive part over said cathode material surface in order to reduce deposits of material due to the first material component on said cathode material surface.

REMARKS

The amendments and remarks presented herein are believed to be fully responsive to the recent Office Action. Accordingly, reconsideration is requested. Claims 1-33 are pending in the application. Claims 7-10, 18, 19, 24 and 28-33 were withdrawn from consideration by the Examiner. Accordingly, claims 1-6, 11-17, 20-23 and 25-27 remain pending in the application.

The specification was objected to because of various informalities set forth in detail in the Office Action. These informalities have been addressed herein.

The drawings were objected to for various informalities set forth in detail in the Office Action. These informalities have been addressed herein.

Claim 1 is objected to because the term "A" should be "An". This informality has been corrected. This correction did not result in a narrowing of the claim coverage.

Withdrawal of the objections to the specification, claims and drawings is requested.

The undersigned gratefully acknowledges the indication that claims 2-6, 11, 12, 15, 16 and 20-23 would be allowable if rewritten in independent form to overcome the objection to claim 1 and to include all of the limitations of the base claim and any intervening claims. Claim 1 has been rewritten in independent form including the limitations of claim 1. Claims 3-6, 11, 12, 15, 16 and 20-23 are dependent upon claim 2 either directly or through an intervening claim. Accordingly, it is submitted that claims 2-6, 11, 12, 15, 16 and 20-23 are in a condition for allowance. A notice to that effect is earnestly solicited.

Claims 1, 3, 14, 17 and 25-27 were rejected either under 35 U.S.C. § 102, as being anticipated by Akamatsu et al. alone or under 35 U.S.C. § 103 as being obvious over the combination of Akamatsu et al. and Klaus et al. The rejection is traversed. Applicants submit that amended claim 1 is patentably distinguishable over Akamatsu et al. alone or in combination with Klaus et al.

Akamatsu et al. does not supply gas to the evaporation-active part of the cathode material surface for avoiding the covering of the cathode by impurities. Rather, the gas-supplying tube (13) of Akamatsu et al. supplies the gas in front of the cathode at a distance to the cathode surface. This leads to the effect that a funnel-shaped beam is formed which does not lead to the removal of undesirable pollution of the cathode material surface. In addition, Akamatsu et al. does not disclose a shading arrangement at the evaporation-active part of the cathode. Although the figure of Akamatsu et al. discloses a cathode part (2) adjacent to the cathode (5), this is not comparable to the arrangement of the present invention as defined by claim 1, since the cathode part (2) is not able to shade the evaporation-inactive part of the cathode from the plasma discharge. Since Akamatsu et al. does not disclose, suggest, nor render obvious the object of the invention as defined by claim 1, nor the structure or function of the gas supply of the electrode arrangement, it is submitted that the basis for the rejections under 35 U.S.C. § 102(a) has been overcome. Nor does Klaus et al. disclose that which was missing in Akamatsu et al. Accordingly, withdrawal of the rejection under 35 U.S.C. § 103(a) is also earnestly requested.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached document is captioned **"Version With Markings to Show Changes Made."**

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Specification:

Paragraph beginning at line 10 of page 6 has been amended as follows:

The anode arrangement 5 comprises a crucible 9 receiving silicon melt 11, from whose surface 13 silicon particles evaporate into the gas space over the crucible ~~19~~2 toward beverage bottle 3. Arrows 15, in this case, symbolize particles evaporating from the silicon surface 13.

Paragraph beginning at line 13 of page 6 has been amended as follows:

The crucible 9 is heated with the aid of an electrical heating means 17 to which heating energy is supplied via leads 19 from a controlled power supply, not illustrated. The anode arrangement 5 is generally the same as the arrangement as described in the said patent publication PCT/EP 99/00768 which is incorporated herein in its entirety by reference.

Paragraph beginning at line 13 of page 8 has been amended as follows:

Abutments 55 are fixedly arranged on the baffle arrangement ~~47~~43, which via springs 57 bias bearings 59 of the shaft 29 toward the anode arrangement 5. This means that the brass cylinder 21 has its peripheral cylinder face 25 thrust against roller bearings 61 arranged adjacent to the baffle opening 45 in the evaporation-inactive part 41 of the peripheral cylinder face 25. This means that with the progress of removal of material from the brass cylinder 21 owing to the evaporation action by the arc discharge 35 and the grinding by the drag member 51 and the resulting reduction in diameter of the brass cylinder 21, the evaporation-active part 27 of the peripheral cylinder face 25 is ~~the~~ always kept in substantially the same spatial relationship to the baffle opening 45 and the anode arrangement 5 so that it is

possible to maintain arc discharge which is substantially constant in time independently of the removal of material from the brass cylinder 21.

Paragraph beginning at line 24 of page 8 has been amended as follows:

In an intermediate space 63 between the peripheral cylinder face 25 and the baffle 43, a gas, as for example oxygen, is introduced via a line 65. At least a part of the gas supplied via the line 65 escapes from the intermediate space 63 through the baffle opening 45 toward the gas space between the silicon melt 11 and the beverage bottle 3, as indicated by the arrows 65 in figure 2. The resulting gas current ~~65~~35 is directed oppositely to the direction 47 of movement of the particles leading to an undesired deposit on the peripheral cylinder face 25. In this respect, gas particles ~~65~~35 will collide with the current of undesired particles ~~27~~47 and deflect same from their path through the baffle opening 45 and prevent later deposit on the peripheral cylinder face 25 so that the undesired effect of deposit of material on the peripheral cylinder face 25 is also reduced.

Paragraph beginning at line 5 of page 9 has been amended as follows:

Figure 3 shows a further embodiment of the invention, which is generally similar to the previously described embodiments and only differs regarding a different configuration of the cathode material body, which is as well in the form of a brass cylinder ~~21~~21a though being able to be rotated about an axis 23a of rotation extending toward an anode arrangement 5a so that an evaporation-active part 27a of the surface of the brass cylinder 21a is arranged on one end face of the cylinder 21a. On rotation of the brass cylinder 21a by a motor 49a about the axis 23a of rotation, the evaporation-active part 27a will describe an annular surface on the cylinder floor 71. The evaporation-active part ~~21~~21a of the cylinder floor face 71 is, in this case, defined by a baffle opening 45a of a baffle arrangement 43a shading off the remaining part of the cylinder floor surface.

Paragraph beginning at line 15 of page 9 has been amended as follows:

In the case of the electrode arrangement 1b depicted in figure 4, the brass body is designed in the form of a rod ~~21b~~41b extending in the longitudinal direction whose flat side 25b facing an anode arrangement ~~5~~5b is substantially shaded by a baffle arrangement 43b, in which a baffle opening 45b is practiced to limit an evaporation-active part 27b on the flat side 25b. Springs 53b, which bear against the baffle arrangement, 43b, engage the flat side 73, which is directed away from the flat side 25b, of the brass rod ~~21b~~41b, such springs thrusting the rod ~~21b~~41b at its flat side 25b toward the anode arrangement ~~5~~5b and against drag members 51b, which are secured to the baffle arrangement 43b. The brass rod ~~21b~~41b is coupled with a drive rod 75, which for its part is joined with a drive, not illustrated in figure 4, in order to reciprocate the rod ~~21b~~41b. Owing to the reciprocation, the evaporation-active part 27b of the flat side 25b is also reciprocated on same so that gradually different areas of the flat side 25b act as evaporation-active parts 27 so that the unfavorable effect of the deposit of particles 47b is reduced, which originate from the silicon melt ~~27b~~11b.

Paragraph beginning at line 28 of page 9 has been amended as follows:

Figure 5 diagrammatically shows an electrode arrangement 1c with an anode arrangement 5c, which also includes a silicon melt 11c, and a cathode arrangement ~~7~~7c. The cathode arrangement 7c comprises, in this case, a cathode material ring 21c of brass, which is stationary in relation to the anode arrangement 5c and is arranged centrally above the silicon melt 11c. Radially within the brass ring 21c, an annular baffle 43c is arranged driven by means of a motor 49c and a friction roller 81 for rotation about its axis 83 of symmetry. The annular baffle ~~4~~343c shades off a large part of the peripheral cylinder face 25c of the brass ring 21c, while a plurality of baffle openings 45c distributed in the peripheral direction in the annular baffle 43c expose evaporation-active part 27c on the cylinder inner face 25c of the brass ring 21c to the arc discharge 35c, all other areas of the cylinder inner face 25c being shaded off, as evaporation-inactive parts 41c, from the arc discharge 35c. The rotation of the

annular baffle 43c about its axis ~~81~~83 means that the evaporation-active parts 27c are moved in the peripheral direction over the cylinder inner face 25c of the brass ring 21c so that progressively the entire inner face 25c is subjected to the cleaning action due to the intensive arc discharge 35c in order to remove material deposits, originating from the silicon melt 11c, thereon.

Paragraph beginning at line 22 on page 10 has been amended as follows:

In the case of the embodiments depicted in figures 6 and 7, it is a question of stationary electrode arrangement, in which both the baffle and also the cathode are stationary, that is to say they are non-rotary or are able to be moved in translation for operations. In the embodiment of figure 6, the baffle is referenced 43d, it fitting over the cathode 21d, only indicated in chained lines, like a hood. On its front side, the hood 43d possesses a baffle opening 45d uncovering the evaporation-active part ~~27e~~27d of the cathode 21d for the arc discharge. The remaining parts of the electrode arrangement are of conventional design so that further details of the construction thereof are unnecessary. However, through the gas supply line 80, an inert protective gas, and more particularly oxygen, argon or an oxygen-argon gas mixture or another suitable gas mixture, is supplied to the area of the evaporation-active part 27d of the cathode within the hood 43d from ~~the~~ a protective gas source 81 only indicated in chained lines. The protective gas thus introduced directly in front of the cathode surface, which, in the present case, is introduced adjacent to the baffle opening 45d, emerges through the baffle opening 45d together with the particles evaporated from the evaporation-active part 27d of the cathode, through the baffle opening ~~45e~~45d so that a self-supporting plasma, may be produced and maintained independently from the Si vapor cloud. Owing to the decoupling from the Si vapor cloud, the arc discharge, and accordingly the plasma process, may be maintained in a substantially more stable manner constantly for longer process times.

Paragraph beginning at line 11 on page 11 has been amended as follows:

In the case of the embodiment of figure 7, in which the same reference numerals are employed as in figure 6, the supply of the protective gas from the rear side of the cathode 21d, that is to say, turned away from the one side, and opposite the baffle opening 45d. This embodiment offers the advantage that the cathode is completely held within flowing protective gas and is therefore protected against entry of particles from the silicon vapor cloud. This extremely effectively prevents poisoning of the cathode surface by evaporated Si oxides, and avoiding the surface being partly covered with an insulating layer, something which would prevent striking the arc and, in the long run, would also substantially limit the use of the cathode and working life. Owing to the supply of protective gas, an area with a higher partial pressure is produced in front of the cathode surface, the protective gas emerging out through the baffle opening into the process space. The quantity of gas employed per cathode is between the 5 sccm and 50 sccm, and preferably amounts to 10 sccm.

In the Claims:

Claims 1 and 2 have been amended as follows:

1. (Amended) ~~A~~An electrode arrangement for the plasma-aided coating of a substrate with a layer, comprising:

at least a first and a second material component which ~~produce~~produces a plasma discharge;

an anode arrangement which defines said first material component at an anode material surface for evaporation; ~~and~~

a cathode arrangement which defines said second material component at a cathode material surface~~;~~, ~~wherein~~ said cathode material surface ~~is~~being constituted by an evaporation-active part supporting the plasma discharge and an evaporation-inactive part not supporting the plasma discharge;

a gas supply for supplying protective gas in front of the cathode material surface to the evaporation-active part of the cathode material surface; and

a baffle arrangement exposing said evaporation-active part at a baffle opening for the plasma discharge and shading of the evaporation-inactive part correspondingly from the plasma discharge;

wherein said protective gas is so introduced into an intermediate space between the baffle arrangement and the cathode material surface that said supplied protective gas escapes at least partially through the baffle opening towards the plasma discharge from the intermediate space between the cathode material surface and the baffle arrangement.

2. (Amended) ~~The electrode arrangement in claim 1 including~~An electrode arrangement for the plasma-aided coating of a substrate with a layer, comprising:

at least a first and second material component which produces a plasma discharge;

an anode arrangement which defines said first material component at an anode material surface for evaporation;

a cathode arrangement which defines said second material component at a cathode material surface, said cathode material surface being constituted by an evaporation-active part supporting the plasma discharge and an evaporation-inactive part not supporting the plasma discharge; and

a motion-producing device for moving said evaporation-active part, and thereby moving said evaporation-inactive part over said cathode material surface in order to reduce deposits of material due to the first material component on said cathode material surface.